

Development of a Low-SWAP, RAD-Tolerant, Thermally Stable, 10Gbps per Channel Fiber Optic Transceiver for Harsh Environment Networking Applications, Phase I

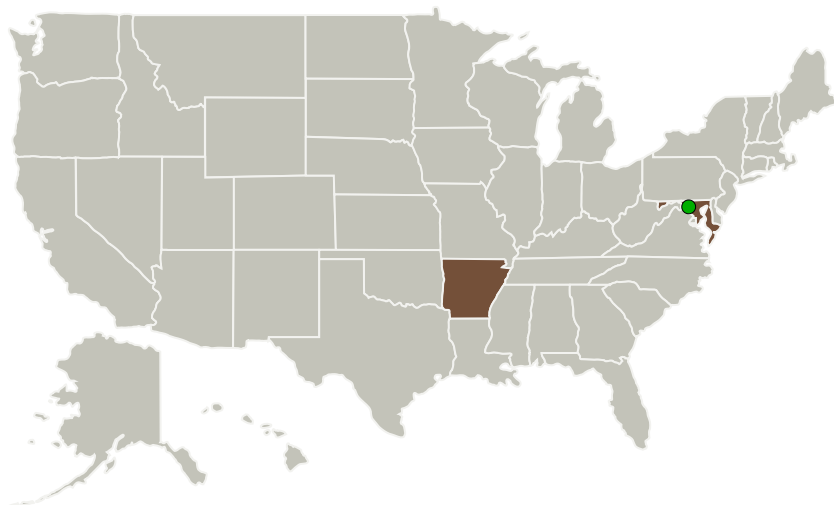
Completed Technology Project (2011 - 2011)



Project Introduction

According to the NASA Topic S3, "the Science Mission Directorate will carry out the scientific exploration of our Earth, the planets, moons, comets, and asteroids of our Solar System and beyond. SMD's future direction will be moving from exploratory missions (orbiters and flybys) into more detailed/specific exploration missions that are at or near the surface (landers, rovers, and sample returns), that would require new vantage points, or that would need to integrate or distribute capabilities across multiple assets. The demand for larger area coverage, higher resolution and multi-spectral capability in satellite remote sensing applications, and the demand for higher data rates in digital satellite communications networks continue to place ever increasing demands on onboard data handling and processing subsystems - 1 Gbps to 4 Gbps data rates are not uncommon and continually increasing. Further, satellite subsystems must be capable of reliable operation in the space radiation environment and will continue to be constrained by SWAP limitations. Shrinking development budgets and rapid development requirements are driving onboard data handling networks toward more flexible, non-proprietary architectures and interface standardization. Therefore, SPI proposes to develop a 10Gbps per channel optical transceiver and mating, multi-channel reprogrammable network interface card (NIC) that are RAD-tolerant to over 300KRad-Si TID, operate reliably from -25C to 85C. Further, the NIC will be fully reprogrammable such that it may be reconfigured and utilized as an optical router, switch, or multi-protocol compatible gateway.

Primary U.S. Work Locations and Key Partners



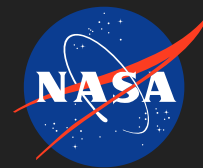
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| Organizations Performing Work | Role | Type | Location |
|-------------------------------------|-------------------------|-------------|------------------------|
| Space Photonics, Inc. | Lead Organization | Industry | Fayetteville, Arkansas |
| ● Goddard Space Flight Center(GSFC) | Supporting Organization | NASA Center | Greenbelt, Maryland |

| Primary U.S. Work Locations | |
|-----------------------------|----------|
| Arkansas | Maryland |

Project Transitions

▶ **February 2011:** Project Start

✓ **September 2011:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138089>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Space Photonics, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

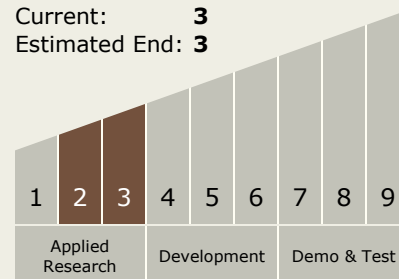
Carlos Torrez

Principal Investigator:

Matthew Leftwich

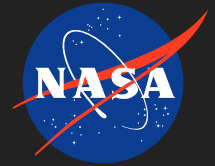
Technology Maturity (TRL)

Start: 2
Current: 3
Estimated End: 3



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Technology Areas

Primary:

- TX02 Flight Computing and Avionics
 - └ TX02.2 Avionics Systems and Subsystems
 - └ TX02.2.5 High Speed Onboard Interconnects and Networks

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System